

Belkinius, a New Subgenus of *Aedes* and a Description of *Ae. (Blk.)*

aurotaeniatus Edwards (Diptera: Culicidae)¹

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ABSTRACT. *Belkinius*, a new subgenus of *Aedes* Meigen, is defined and compared to other subgenera of the genus. A single included species, *Ae. (Blk.) aurotaeniatus* Edwards, is described and illustrated and information is given on its type-data, distribution and bionomics.

INTRODUCTION

A description of *Belkinius*, a new monotypic subgenus of *Aedes* Meigen is presented. The new subgenus is very distinct in all known stages from the other subgenera of the genus. *Aedes (Blk.) aurotaeniatus* Edwards from the Philippine Islands is included in the subgenus and the male, male genitalia, female, female genitalia and pupa are described and illustrated. Its geographical distribution, bionomics and type-data are presented.

Nomenclature and chaetotaxy used for the male, male genitalia, female, female genitalia and pupa follow Harbach and Knight (1980) with the exception of the indices used for the female genitalia which follow Reinert (1974). Measurements on the illustrations and in the descriptions are in millimeters. In the pupal description the range for setal branching is followed by the mode in parenthesis. Abbreviations used in the distribution and synonymy sections follow: ♀ = female, ♂ = male, P = pupa, p = pupal exuvia, and * = part or all of stage figured. Information in the bionomics and distribution sections was taken from collection data sheets and the published literature.

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GENUS *Aedes* MEIGENSUBGENUS *BELKINIUS* REINERT, NEW SUBGENUSType-species: *Aedes aurotaeniatus* Edwards*Stegomyia* in part of Banks 1906: 995; Brunetti 1907: 329; Theobald 1910: 181.*Aedes* (*Stegomyia*) in part of Edwards 1922a: 256, 1922b: 464, 1929: 2, 1932: 163; Bohart 1945: 61; Knight and Hull 1951: 218, 1952: 169; Horsfall 1955: 473; Stone, Knight and Starcke 1959: 181; Delfinado, Viado and Coronel 1962 (1963): 440.*Aedes* (?*Stegomyia*) of Mattingly 1965: 52.*Aedes* (*Paraedes*) of Huang 1970: 281; Basio 1971: 25 (*in part*); Stone and Delfinado 1973: 306 (*in part*); Knight and Stone 1977: 147 (*in part*).

MALE. *Head*. Antenna short, approximately 0.6 length of proboscis, 13 flagellomeres, basal 12 flagellomeres with scales basad of flagellar whorls, pedicel with a patch of broad scales mesally; clypeus bare; maxillary palpus very short; proboscis long and narrow; eyes separated in front; vertex covered with broad decumbent scales; occiput with a few short erect forked scales.

Thorax. Scutum, including prescutellar space, covered with narrow curved scales, scales dark except patterns formed by pale scales, setae relatively few in number, on following areas: anterior promontory, scutal fossal (anterior and lateral), dorsocentral (anterior and posterior), posterior medial scutal, lateral margins of prescutellar, antealar, supraalar, and parascutellar; scutellum with broad scales and several setae on each lobe; antepnota widely separated, with broad scales, several setae; postpronotum with broad scales, very few posterior setae; proepisternum with broad scales and a few setae on upper area, lower area bare; subspiracular area with broad scales; postspiracular area with broad scales, very few setae; paratergite with scales; mesokatepisternum with broad scaled patches on upper and lower areas, very few upper and lower setae; prealar area without scales, very few setae; mesepimeron with a median patch of scales, very few upper setae, lower setae absent. *Legs*.

Posttarsi I-III each with 2 ungues, I and II with ungues unequal in size and simple, III with ungues equal in size and simple. *Wing*. Veins dark scaled; vein radius 2 + 3 much longer than cell radius 2; apex of vein anal 1 ends at or only slightly distad of mediocubital crossvein; alula with a row of narrow scales on margin; upper calypter with setae on margin. *Abdomen*. Terga with laterobasal pale scaled patches, at least on I-VI; terga also with a few short setae on posterior and lateral margins; sterna mainly pale scaled.

Genitalia. Tergum IX trilobed, large, setae absent; gonocoxite short and broad, setae and scales present; gonostylus large, apical portion expanded and with numerous blade-like spines and hair-like spicules, very short setae present, gonostylar claw absent; basal mesal lobe short, with short and minute setae, lies close to mesal surface of gonocoxite; proctiger without teeth or cercal

setae; phallosome with aedeagus composed of 2 pigmented lateral plates each with several tergally curved apical teeth, basal piece broad and expanded laterally; sternum IX with setae.

FEMALE. Essentially as in the male but with the following differences.

Head. Antenna approximately three-fourths length of proboscis, scales restricted to pedicel and flagellomere 1; maxillary palpus short, approximately 0.11-0.12 length of proboscis; proboscis longer than femur I. *Thorax.* Scutal fossal area also with a posterior seta. *Legs.* Tibia III with several long stout setae approximately equally spaced along both dorsal and ventral surfaces; posttarsi I-III with ungues equal in size, I and II toothed and III simple. *Wing.* Remigium with setae. *Genitalia.* Tergum VIII with very few scales, a few short setae on apical 0.35, 2, 3 long stout and several moderately long stout setae on apical margin, VIII-Te index 0.41-0.51; sternum VIII with a few scales on lateral areas, apex with a moderately deep median indentation, setae on apical 0.81, VIII-S index 0.70-0.83; tergum IX short and wide, band-like, setae absent, IX-Te index 0.2-0.3; insula long, tongue-like with a few small tuberculi on apical 0.35; lower vaginal lip narrow, lower vaginal sclerite absent; upper vaginal lip narrow, upper vaginal sclerite medium size; postgenital lobe moderately long, moderately wide, lateral margins concave, apex with a median indentation and with a very few stout setae on each side of midline; cercus with apex truncate and with 5-7 moderately long stout setae, cercus index 2.00-2.33; one large and 2 medium size spherical spermathecal capsules.

PUPA. *Cephalothorax.* Seta 1-CT long; 2, 3-CT moderately long and thin. *Trumpet.* Short, pinna long, internal tracheae large. *Metanotum.* Moderately to heavily pigmented with clear unpigmented spots; seta 10, 12-CT multiple branched, moderately long; 11-CT long and stout; 13-CT present. *Abdomen.* Seta 2-I short, 3-I very long and stout, both single; 1-II-VII with up to 3 branches; 5-VII long; 9-VII long, 3, 4 branched; 11-VII with 2-4 branches; male genital lobe with apex spiculate. *Paddle.* With well developed fringe of hair-like spicules, 1-P single, stout, with apex recurved.

LARVA and EGG. Not known.

DISCUSSION. The subgenus *Belkinius* is characterized and distinguished from the other subgenera of *Aedes* by the following: in the adults by the combination of (1) maxillary palpus very short in both sexes; (2) antenna short, approximately 0.6 (male) or 0.7 (female) length of proboscis; (3) vertex covered with broad decumbent scales, occiput with a few short erect forked scales; (4) dorsocentral setae few on anterior and posterior areas, acrostichal setae absent; (5) prescutellar space covered with scales; (6) proepisternum with broad scales and 2-4 setae on upper area, lower area bare; (7) mesepimeron with only 1-4 setae dorsad of scale patch, lower setae absent; (8) wing vein anal 1 ends at or slightly distad of mediocubital crossvein; (9) male antennal flagellomeres 1-12 with scales basad of flagellar whorls; (10) male posttarsi I and II with ungues unequal in size and simple; and (11) female posttarsi I and II equal in size and toothed; in the male genitalia by the combination of (1) tergum IX trilobed, setae absent; (2) gonocoxite short and broad; (3) gonostylus large, with blade-like spines, gonostylar claw absent;

(4) basal mesal lobe short, with short and minute setae, lies close to mesal surface of gonocoxite; and (5) aedeagus with 2 lateral plates each with several tergally curved apical teeth; in the female genitalia by the combination of (1) tergum VIII with short setae on apical 0.35, 2, 3 long stout and several moderately long stout setae on apical margin; (2) tergum IX short and wide, band-like, index 0.2-0.3, setae absent; (3) insula tongue-like, with a few very small tuberculi on apical 0.35; (4) upper vaginal sclerite medium size; (5) postgenital lobe moderately long, moderately wide, lateral margins concave, apex with a median indentation and with a very few stout setae on each side of midline; (6) cercus short to moderately long, apex truncated with 5-7 moderately long stout setae, index 2.00-2.33; and (7) 3 spermathecal capsules, 1 large and 2 medium size; and in the pupa by the combination of (1) development of trumpet; (2) metanotum with transparent spots, seta 13-CT present; (3) seta 2-I short, 3-I very long; and (4) paddle with well developed fringe of long hair-like spicules, 1-P single, with tip recurved.

Adults of *Belkininus* are somewhat similar in habitus features to those of *Stegomyia* Theobald, as can be seen by a comparison of the characters of the latter subgenus as outlined by Reinert (1973:28) and Huang (1979:4). However, there are a number of *Stegomyia* features mentioned by these two authors that are not shared by *Belkininus*, these follow: proepisternum with 5-7 setae on upper area and broad white or silvery scales on lower area; tarsus III with a large dorsobasal patch or band of white scales on tarsomeres 1 and 2; female maxillary palpus with a large dorsoapical spot or apical band of white scales (absent in *Albolineatus* Group); male maxillary palpus equal or nearly equal to length of proboscis and upturned apically (except *Albolineatus* Group in which it is at least 0.48 length of proboscis); gonostylus shape; and gonostylar claw present. *Belkininus* also has the entire prescutellar space scaled and wing vein anal 1 ending at or only slightly distad of mediocubital crossvein which differs from *Stegomyia*. The female genitalia are markedly different from those of *Stegomyia* in the development of terga VIII and IX, postgenital lobe and cercus. Other differences between *Belkininus* and *Stegomyia* and all other subgenera of the genus *Aedes* are given above.

Belkininus males have short maxillary palpi which are similar to those of the following subgenera of *Aedes*: *Aedes* Meigen, *Bothaella* Reinert, *Cancraedes* Edwards, *Christophersiomyia* Barraud, *Huaedes* Huang, *Leptosomatomyia* Theobald, *Nothoskusea* Dumbleton, *Paraedes* Edwards, *Rhinoskusea* Edwards, *Verrallina* Theobald and most species of *Geoskusea* Edwards.

Male genitalia of *Belkininus* are unique in most features, especially in the development of tergum IX, gonocoxite, gonostylus and basal mesal lobe, and do not display close similarities to other subgenera of the genus.

The female genitalia of *aurotaeniatus* show similarities to those of *Stegomyia*, however, the shape of both the postgenital lobe and tergum IX are markedly different. The shape of the postgenital lobe is somewhat like that of *Skusea* Theobald and the short wide setaeless tergum IX is similar to that of many species of *Verrallina*.

Pupae of *Belkinius* are recognized by the characters listed above, especially by the long pinna of the trumpet, the clear unpigmented spots on the metanotum, the presence of seta 13-CT, and the well developed fringe of hair-like spicules on the paddle. Clear unpigmented spots are also known in the pupae of the leaf axil breeding Kocki Group of the subgenus *Finlaya* Theobald (Belkin 1962:358). Belkin's illustrations of this group show these spots on the cephalothorax, metanotum and first few abdominal terga. E. L. Peyton (personal communication) stated that the cephalothoracic spots of living pupae of species of the Kochi Group (collected in association with *aurotaeniatus* pupae) reflected a bright metallic blue color, but that the spots turned clear and transparent when the pupae died or eclosion occurred. Other than in *aurotaeniatus*, the presence of seta 13-CT in the genus *Aedes* has been reported for only 3 species of *Stegomyia* (*futunae* Belkin, *rotunae* Belkin and *upolensis* Marks) and a few species of *Aedimorphus* Theobald. Reinert [1980 (1981)] presented a review of seta 13-CT for the family Culicidae and described its presence in *aurotaeniatus*. Other subgenera of *Aedes* which have a hair-like fringe of spicules on the paddle are *Abraedes* Zavortink, some species of *Diceromyia* Theobald, *Lorrainea* Belkin and most species of *Stegomyia* (except *Aegypti* and *Albolineatus* Groups). Also, other genera within the tribe Aedini which have a hair-like fringe of spicules on the paddle are *Armigeres* Theobald, *Eretmapodites* Theobald, *Heizmannia* Ludlow, *Udaya* Thurman and *Zeugnumyia* Leicester.

This new subgenus is dedicated to the late Dr. John N. Belkin for his unique and extraordinary contributions to the systematics of the family Culicidae.

DISTRIBUTION. Known only from Negros Occidental and Mindoro Oriental Provinces, Philippine Islands.

BIONOMICS. Adults have been collected biting man at a high altitude. Immatures were taken from the axil of a wild banana tree in hilly terrain.

AEDES (BELKINIUS) AUROTAENIATUS EDWARDS

(Figs. 1-5)

Stegomyia aurostriata Banks 1906: 995 (♀); of Brunetti 1907: 329; Theobald 1910: 154, 181 (♀, key).

Aedes (Stegomyia) aurotaeniatus Edwards 1922a: 256 (key) (*nom. nov.* for *aurostriata* Banks, *non* Doleschall 1857); of Edwards 1922b: 464, 1929: 2, 1932: 163; Bohart 1945: 54, 61, Fig. 44 (♀*, key); Knight and Hull 1951: 218 (key), 1952: 169 (♀, lectotype designation); Horsfall 1955: 473; Stone, Knight and Starcke 1959: 181; Delfinado, Viado and Coronel 1962 (1963): 440.

Aedes (?*Stegomyia*) *aurotaeniatus* of Mattingly 1965: 6, 15, 16, 52 (♀*, keys).

Aedes (Paraedes) aurotaeniatus of Huang 1970: 281 (♂*, ♀*, P*, subgeneric transfer); Basio 1971: 25, 140 (♂*); Stone and Delfinado 1973: 306; Knight and Stone 1977: 147.

Aedes aurotaeniatus of Reinert 1980 (1981): 441 (P*); Reinert 1981: 2 (excluded from subgenus *Paraedes*).

MALE (Fig. 1). *Head*. Antenna brown, 0.56-0.58 length of proboscis, 9-12 long setae in each flagellar whorl, a band of silvery-white scales basad of flagellar whorl on basal 12 flagellomeres, basal 11 flagellomeres short and apical 2 moderately long, pedicel dark brown with a large patch of broad silvery-white scales mesally; clypeus dark brown; maxillary palpus dark brown scaled, 0.12-0.13 length of proboscis; proboscis dark brown scaled with a few pale scales ventrally at approximately 0.75 from base, 1.25-1.29 length of femur I; vertex with integument dark brown, covered with broad dark blackish-brown decumbent scales except for broad silvery-white decumbent scales formed into a broad stripe along coronal suture and extended posteriorly onto occiput and anteriorly onto interocular space, silvery-white scales also on ocular line and formed into 2 longitudinal stripes on postgena anterior to antepnotum, occiput also with a few short pale brown erect forked scales; a few ocular setae, short to moderately long, dark brown except for median pair which is long and pale brown. *Thorax*. Scutal integument dark brown; scutum, including prescutellar space, covered with narrow curved scales except for a small patch of narrow to moderately broad silvery-white scales on anterior promontory area, other scales dark brown except for silvery-white ones as follows: a moderately broad stripe extending from anterior scutal fossal area over anterior and posterior dorsocentral areas to scutoscuteellar suture, a narrow stripe extending from posterior medial scutal area over median prescutellar area, and a small patch on supraalar area; scutal setae dark brown and on following: 2 on anterior promontory area, scutal fossal area (3 anterior and 1, 2 lateral), a few on anterior and posterior dorsocentral areas, 2 on posterior medial scutal area, several on lateral margins of prescutellar area, 1 on antealar area, several on supraalar area, and 1 on parascuteellar area; scutellum with a patch of broad dark brown scales on each lobe, median lobe also with broad silvery-white scales forming a median stripe, dark brown setae on each lobe, 3-6 on lateral lobe and 5 on median lobe; pleural integument medium brown; antepnotum with broad silvery-white scales, 7 dark brown setae; postpnotum with a large dorsal patch of broad dark brown scales and a smaller ventral patch of broad silvery-white scales, 2 dark brown posterior setae; proepisternum with a patch of broad silvery-white scales and 4 pale brown setae on upper area; subspiracular area with a small elongate patch of broad silvery-white scales; postspiracular area with a small posterior patch of broad silvery-white scales, 1, 2 golden setae; paratergite moderately broad, with an elongate patch of broad silvery-white scales; mesokatepisternum with broad silvery-white scales formed into a moderately large upper patch and a medium size lower patch, setae golden-brown, 1, 2 upper and 1, 2 lower ones; prealar area with 3 golden setae; mesepimeron with a moderately large anterior median patch of broad silvery-white scales, 1, 2 golden upper setae dorsad of scales; other pleural areas bare. *Legs*. Coxae I-III with an anterior patch of broad silvery-white scales, several pale brown setae, 1, 2 dark brown setae also on I; trochanters I-III with white scales, a few short golden setae; femora I and II with anterior surface dark

brown scaled, I with posterior surface dark brown scaled with a narrow median longitudinal white scaled stripe from base to apex, stripe broader at base, II with posterior surface dark brown scaled with a narrow ventral longitudinal white scaled stripe from base to apex, stripe moderately broad at base, III with both anterior and posterior surfaces white scaled except for dark brown scales along apical 0.7 of dorsal surface and overlapped slightly on apical 0.35-0.40 of anterior surface and covering most of dorsoapical 0.4-0.5 of posterior surface; tibia I-III dark brown scaled and with a narrow longitudinal pale scaled stripe on ventral surface, stripe less distinct on I; tarsi I-III dark brown scaled, III also with a narrow longitudinal pale scaled stripe on ventral surface of tarsomeres 1 and 2; posttarsi (Fig. 5) I and II with ungues unequal in size and simple, III with ungues equal in size and simple. *Wing*. Dorsal and ventral veins dark brown scaled; alula with a row of narrow pale brown scales on margin; upper calypter with pale brown setae on margin; no remigial setae seen. *Halter*. Pedicel pale, capitellum dark brown scaled. *Abdomen*. Terga I-V dark brown scaled, each with a laterobasal white scaled patch, I and II with white scaled patch extending to posterior margin; sterna II-V white scaled, a few brown scales on posterior margins of III-V; a few short pale brown setae along posterior and lateral margins of terga; remainder of abdomen mounted on a microscope slide, however, Huang (1970: 283) reported that tergum VI had a large laterobasal pale scaled patch, sternum VI was largely covered with white scales, and segments VII, VIII were entirely dark scaled. *Genitalia* (Fig. 2). Tergum IX long, apex broad and flattened with a small lobe on both lateroapical angles and a large tergally produced median apical lobe, apical margin and all 3 lobes covered with long hair-like spicules, lateral surface connected to sternum IX by a broad band; gonocoxite somewhat spherical in appearance, tergal surface with a median patch of setae from near base to apex, basal setae short and apical setae very long and stout, lateral surface with a few long stout setae and several broad scales, ventral surface with a very small mesoapical lobe with 2 long moderately stout setae and 5-8 short setae, remainder of ventral surface with several short thin setae scattered over mesal area, moderately long setae on median area, a few long to very long setae on median apical area, one short curved seta on basomesal area, and a number of broad scales on most of surface; gonostylus 0.68-0.72 length of gonocoxite, basal 0.27-0.28 broad, apical portion expanded into a bird's head-shaped structure bearing 14-17 very short thin setae on tergal surface, one short seta on apical margin, numerous large blade-like spines on apical and mesal margins (some mesal spines with recurved tips), numerous long hair-like spicules on apical, lateral and ventral surfaces (ones on lateroapical area longer), gonostylar claw absent, gonostylus attached at apex of gonocoxite; basal mesal lobe short, with a somewhat circular area attached to mesal membrane of gonocoxite which bears 33-38 minute setae and 2, 3 similar setae on an apical extension to near base of gonostylus, also with a short lobe near apicomesal area of gonocoxite which bears 14, 15 short setae, a narrow band covered with hair-like spicules connects basal mesal lobes; proctiger short, lightly to moderately pigmented, paraproct with apex rounded, not extending beyond apical margin of tergum IX; phallosome with aedeagus moderately long, heavily pigmented, consisting of 2 lateral plates connected basally and apically, apical portion of each with 7-10 short teeth, those at apex curved tergally, paramere 0.66-0.71 length of aedeagus, moderately pigmented, basal piece broad and produced laterad; sternum IX moderately large, only one short caudomesal seta seen.

FEMALE (Fig. 1). Essentially as in the male but with the following differences. *Head*. Antenna 0.63-0.70 length of proboscis, flagellomeres dark brown, without scales except pale brown flagellomere 1 with white scales, setae in flagellar whorls long but shorter than in male, 5, 6 setae in flagellar whorls; maxillary palpus 0.11-0.12 length of proboscis; proboscis 1.18-1.22 length of femur I. *Thorax*. Scutum with pale scaled areas silvery-white or golden white; scutal fossal area with 2, 3 anterior and 1 posterior setae in addition to 1, 2 lateral setae; scutellum with 4, 5 setae on lateral lobe and 4, 5 setae on median lobe, some specimens with median lobe completely white scaled and with a few broad white scales on lateral lobes; antepronotum with 6-9 setae; postpronotum of some specimens with scales all white; proepisternum with 2-4 setae on upper area; subspiracular white scaled patch connected with postspiracular scale patch in some specimens; postspiracular area with 1-4 setae; prealar area with 3-9 setae; and mesepimeron with 1-4 setae dorsad of scale patch. *Legs*. Tibia III with a moderately broad subapical white scaled patch on anterior surface, 5-7 long stout golden setae equally spaced along both dorsal and ventral surfaces; tarsus II with a very small basal white scaled band or ventrobasal white scaled spot on tarsomere 1; posttarsi I-III (Fig. 5) each with 2 ungues, I and II with ungues equal in size and toothed, III with ungues equal in size and simple. *Wing*. Remigium with 1 or 2 setae. *Abdomen*. Terga with laterobasal white scaled patches larger, II and III with patch extending to or nearly to posterior margin in some specimens. *Genitalia* (Fig. 3). Tergum VIII covered with minute spicules, moderately pigmented, 1-5 scales, base concave mesally, apex slightly convex, a few short setae on apical 0.27-0.35, 2, 3 long stout and 6-9 moderately long stout setae on apical margin, basolateral seta present, VIII-Te index 0.41-0.51, VIII-Te/IX-Te index 5.00-6.13, length 0.15-0.22 mm, width 0.42-0.46 mm; sternum VIII covered with minute spicules, moderately pigmented, a few scales on lateral areas, base slightly concave mesally, apex with a moderately deep median indentation (0.11-0.12 of length), short moderately stout curved setae along apical margin, short and a few moderately long setae scattered over apical 0.72-0.81, setae 1-3-S in a more or less diagonal line, 1-S basomesad of 2-S and 3-S apicolaterad of 2-S, basolateral seta present, apical intersegmental fold moderately pigmented, VIII-S index 0.70-0.83, length 0.27-0.32 mm, width 0.35-0.39 mm; tergum IX covered with minute spicules, moderately pigmented, formed into a narrow band, IX-Te index 0.2-0.3, length 0.03-0.04 mm, width 0.13-0.17 mm; insula covered with minute spicules, with 4, 5 very small tuberculi, each with a minute spicule, tuberculi located on apical 0.25-0.35; lower vaginal lip with numerous minute to short spicules scattered over surface, moderately pigmented; upper vaginal lip with short spicules, moderately pigmented, upper vaginal sclerite moderately pigmented, postgenital lobe covered with short to moderately long spicules, long spicules on lateral margins, apex with a moderate to deep median indentation (0.16-0.34 of length), with 2, 3 long stout setae on each side of midline, 4-6 total setae, dorsal PGL index 1.05-1.25, ventral PGL index 1.47-2.25, ventral length 0.07-0.11 mm; proctiger with scattered short spicules over entire surface; cercus covered with short to moderately long spicules, dorsal surface with a few short setae on apical 0.46-0.52, scales absent, ventral surface with 2-4 short setae on apical margin, cercus index 2.00-2.33, cercus/dorsal PGL index 2.60-3.18, cercus length 0.13-0.16 mm; one large and 2 medium size spermathecal capsules, heavily pigmented, several spermathecal capsule poses near orifice, accessory gland duct base moderately pigmented.

PUPA (Fig. 4). Description based on 3 pupal exuviae which have associated adults. *Cephalothorax*. Mesal area between respiratory trumpets moderately pigmented; lateral area with poorly developed cuticular ocular facets; setae 1-3-CT with 2 branches; 4-CT with 2-4(3) branches, short; 5-CT with 3-5 branches, moderately long; 6-CT single or 2(1) branched, short; 7-CT with 3, 4(4) branches, moderately long; 8-CT with 2-4(2) branches; 9-CT with 2, 3(2) branches. *Trumpet*. Moderately pigmented; pinna long, 0.39-0.52 length of trumpet; index 3.88-4.42, mean 4.19. *Metanotum*. Mesal 0.75-0.80 moderately to heavily pigmented with 2, 3 clear unpigmented spots; setae 10, 12-CT with 3, 4(4) branches; 11-CT single or 2(1) branched; 13-CT single, short. *Abdomen*. Dorsomesal areas of I, III-V and most of dorsum of II moderately to heavily pigmented; terga of I-III with several setae on tuberculi; seta 1-I with 12-18 (15) branches on basal one-third; 2, 3, 6, 9-I single; 4-I with 6-10(6) branches; 5-I with 2 branches; 7-I with 2, 3(2) branches; 0, 2, 3, 6, 9-II single; 1, 10-II with 2 branches; 4-II with 2-6(3) branches; 5-II single or 2(1) branched; 7-II with 3, 4(4) branches; 8-II single to 3(1) branched; 11-II single or 2(2) branched; 0, 2, 6, 9, 11, 14-III single; 1, 4-III with 2, 3(2) branches; 3, 5-III single or 2(1) branched; 7-III with 2, 3(3) branches; 8, 10-III with 2 branches; 0, 2, 5, 6, 9, 11, 14-IV single; 1, 7-IV with 2, 3(2) branches; 3-IV with 4, 5(5) branches; 4-IV with 2-5(2) branches; 8-IV with 2, 3 branches; 0, 2, 5, 6, 9, 11, 14-V single; 1, 10-V with 2 branches; 3-V with 2-4(3) branches; 4-V with 3, 4(4) branches; 7-V with 3-5(4) branches; 8-V with 2, 3(3) branches; 0, 2, 5, 9-11, 14-VI single; 1-VI single or 2(2) branched; 3-VI with 2-4(4) branches; 4-VI with 2-5(4) branches; 6-VI single or 2(1) branched; 7-VI with 2 branches; 9-VI with 2, 3(2) branches; 0, 2, 7-VII single; 1-VII single or 2(2) branched; 3-VII with 2, 3(2) branches; 4, 10-VII with 2 branches; 5-VII single or 2 branched, long; 6-VII with 2-4(4) branches; 8-VII with 2-5(3) branches; 9-VII with 3, 4(4) branches, long, caudad and slightly laterad of 6-VII; 11-VII with 2-4(2) branches; 14-VII single or 2(1) branched; 0, 14-VIII single; 4-VIII with 2 branches, attached laterad to base of paddle; 9-VIII with 7, 8(8) branches, long. *Paddle*. With long hair-like spicules on apical 0.70-0.74 of outer and apical 0.41-0.47 of inner margins; seta 1-P single, moderately long with apex recurved; index 1.33-1.47, mean 1.41.

LARVA and EGG. Not known.

TYPE-DATA. An adult female cotype of *Stegomyia aurostriata* Banks was designated as lectotype by Knight and Hull (1952: 169) and is located in the British Museum (Natural History) (BMNH). The lectotype bears the following data on the adult labels: Canlaon Volc., Negros, P. I., 24-VI-06; Philippine Is., C. S. Banks, 1908-243; Co-type [circular label with yellow border]; Co-type, *Stegomyia aurostriata* Banks, ♀, Det. C. S. Banks; type [circular label with a red border]; *Stegomyia aurostriata* Banks, Lectotype, see Knight and Hull, Pacif. Sci., 6: 169, 1952; and T81.5 Term. [genitalia preparation number]. Banks (1906: 996) reported that the type female, No. 6082, was deposited in the Entomology Collection, Bureau of Science, Manila, Philippine Islands and contained the following collection data: Negros Occidental, P. I., Canlaon Volcano, Mt. Siya-Siya, altitude 760 m, and 24 June 1906. Knight and Hull (1952: 169) state Banks' types in Manila are nonexistent. The lectotype is in fair condition, but has rubbed areas on the head, thorax and abdominal

terga, and the following parts missing: flagellomeres of left antenna, right midleg, tarsomeres 2-5 of right hindleg and tarsomeres 4, 5 of left hindleg. The genitalia are mounted in Canada balsam on a microscope slide and are in excellent condition.

DISCUSSION. Huang (1970: 281) transferred *Ae. aurotaeniatus* from the subgenus *Stegomyia* to the subgenus *Paraedes* and stated ". . . the male terminalia of *aurotaeniatus* appears to have some rather basic genitalic characters in common with *Paraedes*, suggesting a close affinity. In addition other morphological characters of *aurotaeniatus* . . . show a close resemblance to *Paraedes*." This transfer, I believe, was based on superficial characters that do not reflect phylogenetic affinities. Therefore, *aurotaeniatus* was excluded from the subgenus (Reinert 1981: 2). Significant differences exist between all the known stages of *aurotaeniatus* and those of the species in the subgenus *Paraedes*. A number of these differences is noted below in which the feature for *aurotaeniatus* is listed first and is followed in parentheses by the corresponding feature for *Paraedes*. Differences in the adults (both sexes) are: antennal pedicel with a large patch of broad scales mesally (with a few small scales and short fine setae mesally); prescutellar space covered with scales (without scales); subspiracular space with scales (without scales); mesokatepisternum with 1, 2 upper and 1, 2 lower setae (with 1-4 upper and 6-18 lower setae); mesepimeron with 1-4 setae dorsad of scale patch (with 6-18 setae dorsad of scale patch); in the male: antenna short, approximately 0.60 length of proboscis, flagellomeres 1-12 with scales basad of flagellar whorls (moderately long to long, 0.89-1.30 length of proboscis, scales only on flagellomere 1); proboscis very long, 1.25-1.29 length of femur I (moderately long to long, 0.87-1.14 length of femur I); posttarsi I and II with ungues unequal in size (I and II with ungues equal in size); in the female: antenna 0.63-0.70 length of proboscis (1.14-1.52 length of proboscis); maxillary palpus 0.11-0.12 length of proboscis (0.16-0.23 length of proboscis); vertex covered with broad decumbent scales (with both broad and narrow decumbent scales); in the male genitalia: tergum IX trilobed, setae absent (bilobed, 2-9 setae on each lobe); gonocoxite short and broad (moderately long and moderately broad); gonostylus large, apical portion expanded and with numerous blade-like spines and hair-like spicules (long, bifid, trifid in one species, one arm with spicules forming file-like ridges); basal mesal lobe short, with short and minute setae, lies close to mesal surface of gonocoxite (long, well developed, with 2 arms, one arm long, narrow, curved and with 3 stout apical setae, other arm broader with 3-5 flattened apical or subapical setae or with a number of spines, extended caudad away from mesal surface of gonocoxite); paraproct with apex rounded (with apex produced into a blunt point); lateral plates of aedeagus with 7-10 short curved teeth (lateral plates with up to 3 stout teeth); paramere 0.66-0.71 length of aedeagus (0.80-1.02 length of aedeagus); sternum IX with one short thin seta (with 2-4 long stout setae); in the female genitalia: tergum VIII with setae on apical 0.35, 2, 3 long stout and several moderately long stout setae on apical margin, VIII-Te index 0.41-0.51, VIII-Te/IX-Te index 5.00-6.13 (setae on apical 0.46-0.94, those on apical margin short and thin, some species with a few moderately long thin setae on apical margin, VIII-Te index 0.56-1.12, VIII-Te/IX-Te index 1.73-2.65); tergum IX short and wide, band-like, IX-Te index 0.2-0.3, setae absent (moderately long and moderately wide, IX-Te index 0.56-0.98, 1-7 setae on each side of midline); insula with tuberculi on apical 0.25-0.35 (with tuberculi near middle of length); postgenital lobe with lateral margins concave, apex with 2, 3 long stout setae on each side of midline (with

lateral margins straight or convex, apex with 4-13 short to moderately long thin setae on each side of midline); cercus with apex truncated and with 5-7 moderately long stout setae (with apex sharply rounded and with 2, 3 long stout setae); 3 spermathecal capsules, one large and 2 medium size (one large seminal capsule, one species with 3); and in the pupa: seta 1-CT long, 2, 3-CT moderately long (1-3-CT subequal in length); pinna of trumpet long (pinna short); metanotum with clear unpigmented spots (uniformly pigmented); seta 13-CT present (13-CT absent); and paddle with a well developed fringe of hair-like spicules on margins (without hair-like spicules on margins). Because of the unique features of *aurotaeniatus* and the numerous differences between it and *Paraedes*, as well as all subgenera of *Aedes*, a new monotypic subgenus, *Belkinus*, is proposed for this species.

Confusion about the correct taxonomic placement of *aurotaeniatus* was expressed by Banks (1906: 996) when he initially described the species (as *aurostriata*). Banks stated, "I am at a loss to know whether to place it with the *Stegomyia* or to erect for it a new genus, it having a bare clypeus, no banding upon the tarsi, the incrassate vein well developed and quite removed from Vein V, and being brown and gold, while most or all *Stegomyia* are black and white, with occasionally some suggestion of yellow or gold. Owing to its cephalic mesonotal and scutellar characters it should surely be placed in *Stegomyia*, but then again it has 5-jointed palpi." Mattingly (1965: 52, 53) similarly questioned, but included, this species in *Stegomyia* and stated that unusual features for *Stegomyia* include the dark legs and palpus, well developed dorsocentral setae and absence of broad scales from the supraalar patches. Huang (1970: 281), after the discovery of the male and pupa, transferred *aurotaeniatus* to the subgenus *Paraedes* as discussed above.

Banks (1906: 996) in the original description of his new species, *aurostriata*, stated, "A large number of specimens were obtained, all quite uniform in size and markings." There are five female specimens in the U. S. National Museum (Natural History) (USNM), all in very poor condition, which bare two labels with the following data: Acc. No. 6082, Lot, Govt. Lab. Coll.; and *Stegomyia aurostriata* Banks, Det. C. S. Banks. These five specimens are presumably from the type-locality and the type-series, though not specifically labeled as such. No record of accession number 6082 could be found in the records of the USNM (Thomas V. Gaffigan, 2 Sept. 1981, personal communication).

DISTRIBUTION. Twelve specimens examined: 2 ♂ p, 1 ♀ p and 6 ♀.

REPUBLIC OF THE PHILIPPINES. *Mindoro Island, Mindoro Oriental Province*, Victoria District, Mataptap, Alcate, 15 July 1969, E. L. Peyton and Y-M. Huang, 456-100 ♂ p, 456-105 ♂ p, 456-106 ♀ p. *Negros Island, Negros Occidental Province*, Mt. Siya-Siya, Volcano Canlaon, 24 June 1906, C. S. Banks, 5 ♀ and 1 ♀ (lectotype).

DISTRIBUTION FROM LITERATURE.

REPUBLIC OF THE PHILIPPINES. Mindoro, Victoria, Mataptap, Alcate (Huang 1970: 285; Reinert 1980 (1981): 441); Negros Occidental, Mt. Siya-Siya, Volcano

Canlaon (Banks 1906: 996; Theobald 1910: 181, Knight and Hull 1952: 170; Mattingly 1965: 52; Huang 1970:285).

BIONOMICS. In the Philippine Islands pupae were collected by Peyton and Huang from water in the leaf axil of a wild banana tree, located in partial shade, in a scrub environment, in hilly terrain, 100-999 m from houses, on 15 July 1969, and in association with immatures of *Aedes (Finlaya)* species. Banks (1906: 996) reported that the adult female specimens from the type-series were collected during the month of June at a high altitude (760 m), on a rainy day, attacked man very readily, and all specimens were caught on the bare legs of native carriers.

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LIST OF FIGURES

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FIGURE ABBREVIATIONS

Male Genitalia

| | | | |
|------|--------------------|-------|--------------|
| Ae | = Aedeagus | IX-Te | = Tergum 9 |
| BML | = Basal mesal lobe | Par | = Paramere |
| BP | = Basal piece | PH | = Phallosome |
| Gc | = Gonocoxite | Ppr | = Paraproct |
| Gs | = Gonostylus | Pr | = Proctiger |
| IX-S | = Sternum 9 | | |

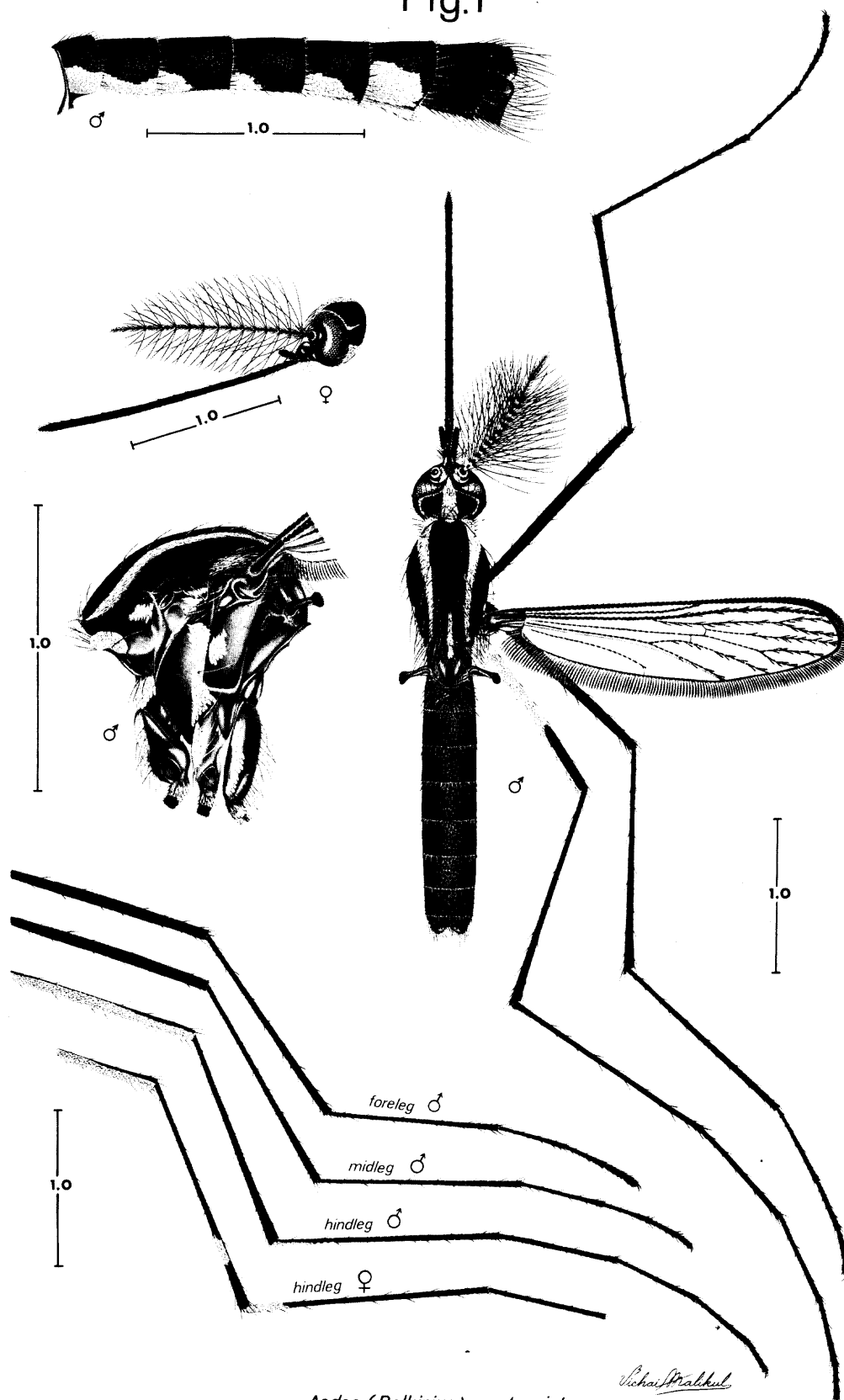
Female Genitalia

| | | | |
|-------|--|---------|-----------------------------|
| AGDB | = Accessory gland duct base | Pr | = Proctiger |
| BLS | = Basolateral seta | SCa | = Spermathecal capsule |
| Ce | = Cercus | SCaP | = Spermathecal capsule pore |
| DPGL | = Line of attachment of proctiger to dorsal surface of PGL | Tu | = Tuberculus |
| H | = Hinge | UVL | = Upper vaginal lip |
| I | = Insula | UVS | = Upper vaginal sclerite |
| IX-Te | = Tergum 9 | VIII-S | = Sternum 8 |
| LVL | = Lower vaginal lip | VIII-Te | = Tergum 8 |
| PGL | = Postgenital lobe | 1-3-S | = Setae 1, 2, 3-S of VIII-S |

Pupa

| | | | |
|--------|--------------------------|-----|-------------|
| CT | = Cephalothorax | Mtn | = Metanotum |
| GL | = Genital lobe | Pa | = Paddle |
| I-VIII | = Abdominal segments 1-8 | T | = Trumpet |

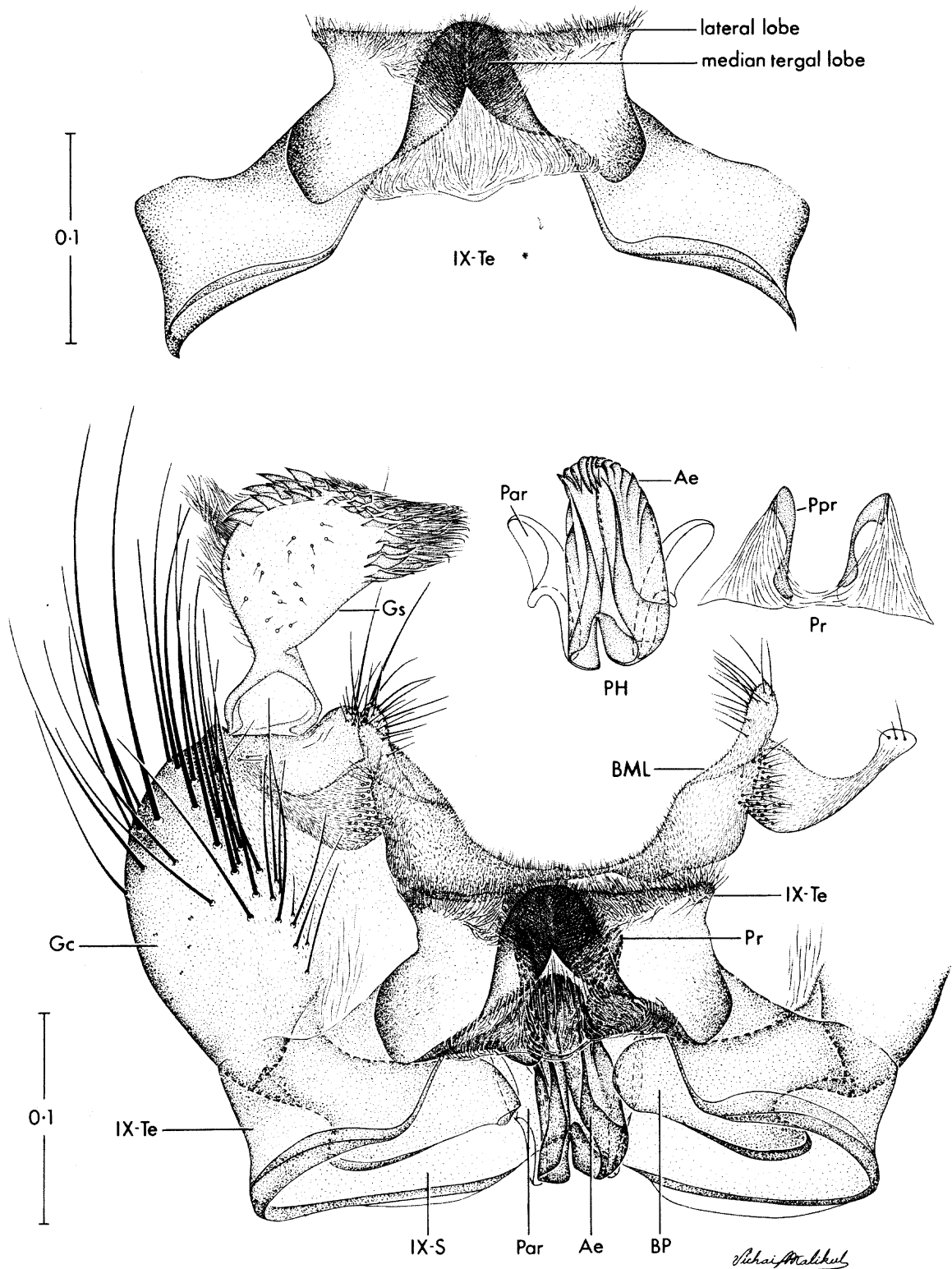
Fig.1



Aedes (Belkinus) aurotaeniatus

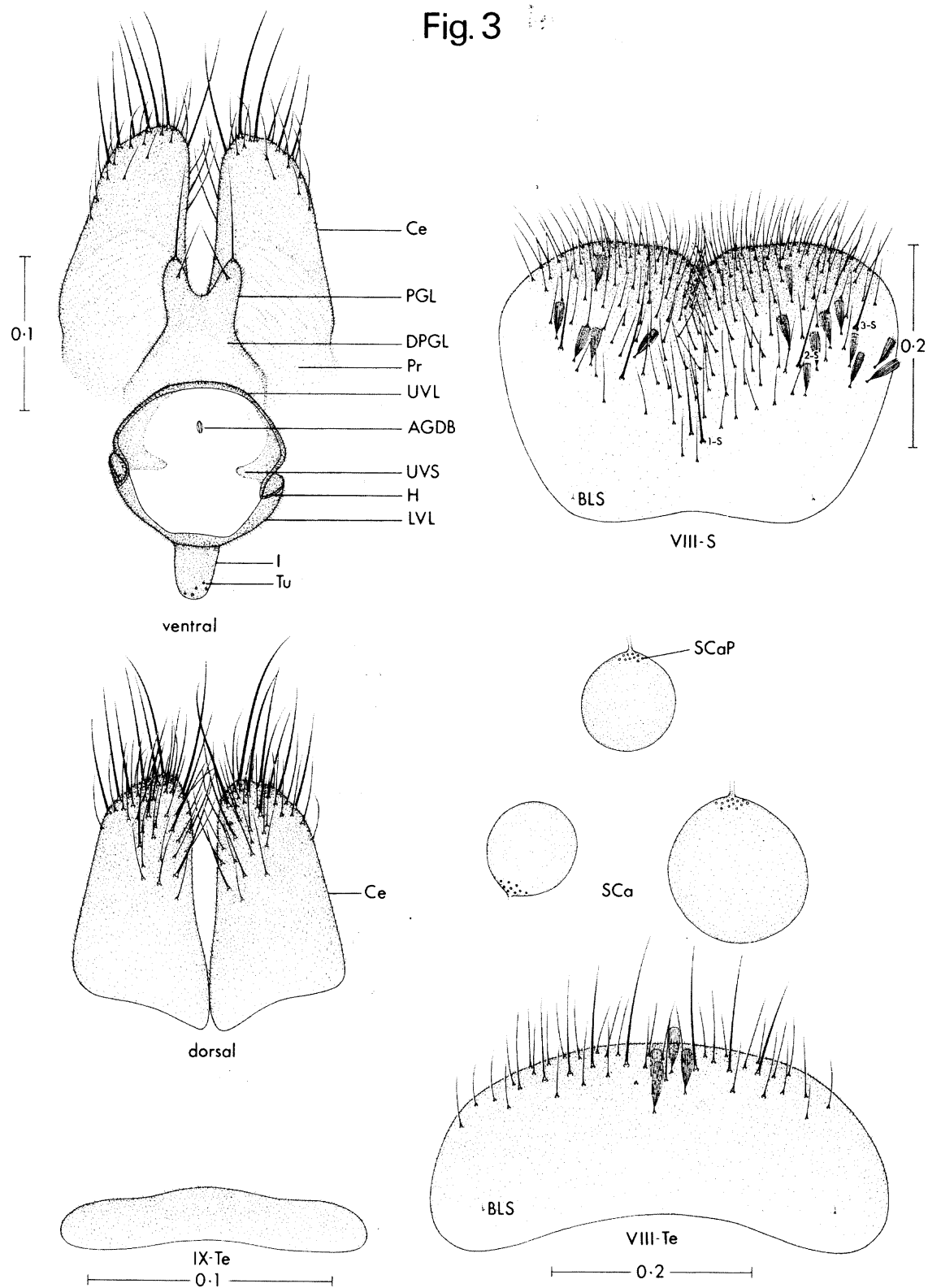
Pichai Stralkul

Fig.2



Aedes (Belkinus) aurotaeniatus

Fig. 3



Aedes (Belkinus) aurotaeniatus

Vichai Mahkhal

Fig.4

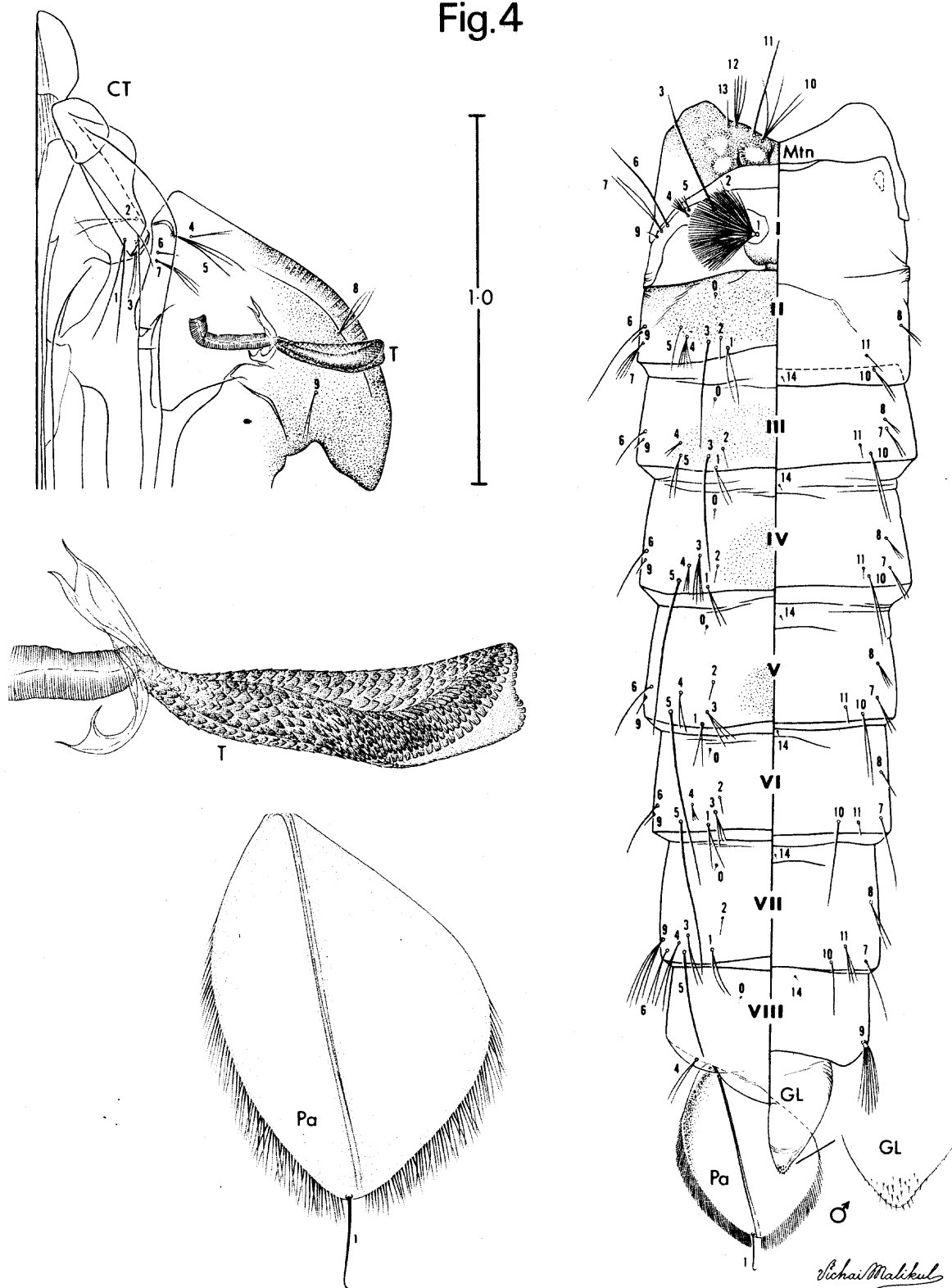
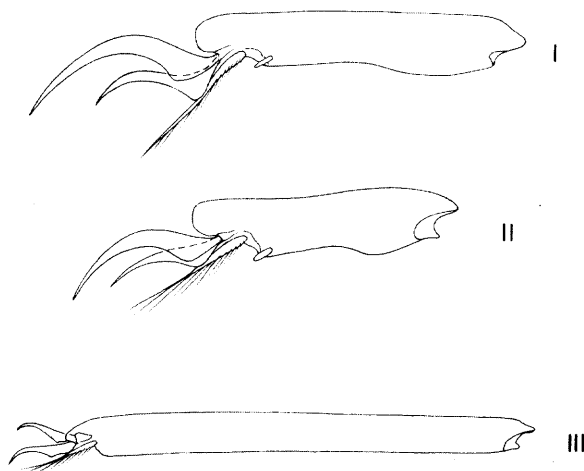
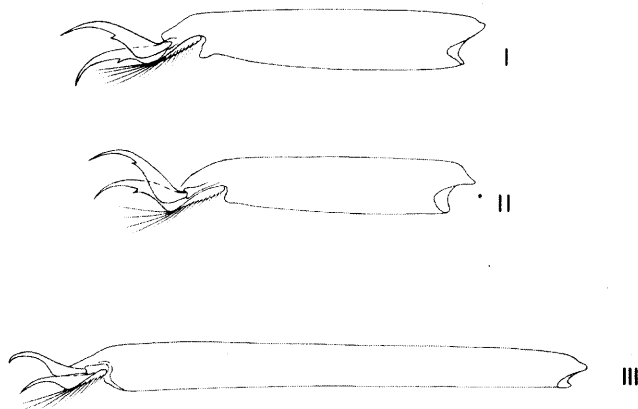
*Aedes (Belkinus) aurotaeniatus*

Fig.5



Male



Female

Pichai Malikul

Aedes (Belkinus) aurotaeniatus